

bulk of the gases. Care must, however, be taken that the flues are nowhere so contracted, nor so constructed, as to cause, by awkward bends or in any other way, any obstruction to the draught, otherwise similar bad consequences will ensue."

From this statement, says Mr. Fairbairn, it would appear that 26 square inches of area over the bridge is about the correct proportion for the combustion of 13 lbs. of coal per hour on each square foot of grate-bar. Now these proportions are rather more than are given in stationary boilers, as the mean of a number of experiments, taken where the combustion was most perfect, gave about 18 square inches over the bridge, and about 28 square inches as the area of the flues to every square foot of grate-bar.

These data may not at first sight appear important: they are, however, of great value in practice, as the economy of the fuel and the efficiency of the furnace in a great measure depend upon the height of the bridge behind, which operates as a retarder of the currents, in the same way as the damper is used for checking the draught of the chimney in the flues."

In these pamphlets much information will be obtained respecting the principal smoke-consuming furnaces, which have from time to time been brought forward. Touching one of these, of great ingenuity and merit, we regret to know—and it is no secret—that its inventor and patentee, Juckes, is at present an inmate of the Queen's Bench, and for a very small amount as compared with the value of his invention.

In a conclusion, we would caution the reader against the supposition that, because smoke may be prevented, therefore tall chimneys can be got rid of. Dr. Ure, in his evidence before a committee of the House of Commons, in August, 1843, intimated that the contrivances from Watt to the present time, which were directed to the burning of smoke, were grounded on a great error,—that while the result sought, and often attained, was the annihilation of smoke, it was attended with a greater evil, the creation of a far more noxious, though invisible, gas: he explained that, in the carbonic acid and smoke passing over the incandescent fuel, the former imbibed, and carried off, an additional portion of charcoal from the latter, and exchanged its proportion of 2 atoms of oxygen and 1 of charcoal, to equal portions of these gases, and thus became carbonic oxide, a gas of the most fatal description. The gases are still generated, and thrown off, notwithstanding that they are insensible to the eye.

#### ARTISTIC AND RAILWAY MEMS. IN IRELAND.

THE bridge over the river Luir, at present in course of construction at Caher, on the Waterford and Limerick Railway, is one of the largest yet constructed in Ireland. The remainder of the works on the line are steadily progressing under the superintendence of Mr. Wm. Dargan.

The directors of the Provincial Bank are about having a new bank erected at Maryborough.

A new church is about to be erected at Lisnakea, according to the designs of the architect to the Ecclesiastical Commissioners: a large allotment of ground has been given by the Earl of Erne, with a subscription of 500*l.* towards defraying the expenses.

The Poor-Law Commissioners are erecting a new workhouse at Corrafin, county Clare, according to the drawings of their architect, Mr. Wilkinson. The works are now nearly complete. Messrs. Crowe and Sons, of Dublin, are the builders; and the expenditure will be about 6,000*l.*

The works at the new Roman Catholic church which is being erected at Rathmines, county Dublin, are progressing slowly. The old church is nearly enclosed by the new one, the walls of which are almost raised to the level of wall plate. The tetrastyle portico (originally intended) is not yet in course of erection. The front facing Rathmines-road is alone in chiselled granite stone, from the Wicklow quarries, the remaining exterior portion of the building being of rubble masonry, composed of black stone, which forms a bad contrast. Mr. P. Byrne is the architect.

The Midland Great Western Railway terminus, at Dublin, is now complete, with the exception of a few trifling finishings. The entire building is in chiselled granite stone, supplied by Mr. P. Ollagan, of Ballyknockin quarry. The expenditure incurred in erecting the directors' house and terminal buildings is about 23,000*l.* A massive retaining wall with curvilinear batter composed of rough banded limestone, with granite capping serving as parapet for roadway, has been erected the entire extent of east elevation, which faces Phiborough-road.

A model school is to be built at Louth, according to the designs of the architect to the Commissioners of National Education.

A submarine cable is to be established between Kingstown and Holyhead, and Mr. Jacob Brett has had an interview with the Lord-Lieutenant on the subject. Two wires are intended for Government and two for general and commercial purposes, and will be connected with those on the Midland Great Western and Great Southern and Western Railways, contracted for, we understand, at 200*l.* per mile.

A new church has been erected at Doe, county Donegal, by the Ecclesiastical Commissioners, in conformity with the designs of their architect: the interior woodworks, sittings, &c. are not yet complete.

A model school is about to be established by the corporation of Drogheda.

A new bridge, at a cost of 60,000*l.* is to be erected at Londonderry, 20,000*l.* are to be produced from the Londonderry and Enniskillen Railway Company.

Additions are being made to several of the large business houses in Dublin, but generally speaking the building trade is dull there.

#### BUILDERS' CHARGES FOR SURVEYING OR FOR ARCHITECTURAL DESIGNS.

SOME time ago, an action was brought in the Lambeth County Court, before Mr. G. Chilton, by Mr. Shaw, a baker, to recover 2*l.* 5*s.* for goods supplied to Mr. Eccles, a master builder of Bristol. The defendant pleaded the following set-off, verbatim:—

"1851. June 16.—To measuring and making A plan for A House, which I agreed to build for 90*l.* attending on district-surveyor, &c., at 2*l.* per cent. on Cost of house 2*l.* 5*s.*"

In answer to the questions of Mr. Bussell, solicitor for plaintiff, Mr. Shaw proved the claim; and with respect to the set-off, said that Eccles being a customer of his, he had employed him upon various building jobs; and upon requiring a new out-house he asked the defendant to come and look at it. He did so upon two occasions, on two Sunday mornings, and brought a bit of paper, upon which he made some pencil marks, with him. He never authorised him to act in the capacity of a surveyor or architect.

Mr. Eccles said he did not deny the plaintiff's claim for bread; and with regard to the above set-off Mr. Shaw requested him to give in an estimate for the building, and he did so for 90*l.* His contract was not accepted, and he accordingly charged 2*l.* 5*s.* for planning and measuring. Was in the habit of making such charges. Was not a surveyor or architect, but a builder at Bristol.

Mr. Bussell said the way in which the set-off was written, evidenced that Mr. Eccles was unqualified for the respectable and responsible calling of a surveyor or architect. It was an abuse upon the profession for persons like the defendant to assume a surveyor's calling. To show that Eccles was unqualified to even draw a plan, he would call Mr. Lett, the district-surveyor, into the witness-box. With respect to the other view of the set-off, it was quite clear that it was so afterwards, and that his client would never have heard of the defendant's absurd charge for surveying had it not been for the summons for bread owing.

Mr. Frederick Lett said he was the district surveyor; that on the 16th of June of last year, he was informed by the plaintiff he had applied to Eccles for an estimate for making a proposed addition to a house in Loughborough-road. At that time Eccles had not in any way defined in what way he purported making the addition for which 90*l.* was demanded. He was then instructed by Mr. Shaw to obtain tenders from several builders, giving Eccles an opportunity to tender. He did so, and having opened the tenders on the 6th of July, found the lowest to be Mr. Roycroft's (84*l.*), who refused to take any more of the works. Eccles declined to tender under him (Mr. Lett). His

charge against Mr. Shaw, for detailed specification, drawing, superintendence of the works, and examining Roycroft's account, was 4*l.* 4*s.*

Mr. Eccles here said that he had demanded payment of Mr. Shaw for the work he had done, and, far from objecting to the demand, Mr. Shaw had agreed to it.

The Judge.—You hear what Mr. Eccles swears: is it so?

Mr. Shaw.—I swear that no demand was ever made upon me till now; and, on my oath, I never agreed to it.

Mr. Bussell.—It was clearly an afterthought.

The Judge.—It is perfectly clear Mr. Eccles has no right whatever to charge for the professional services of a surveyor: he admits he is a builder, and not a surveyor; therefore his charge for surveying is illegal. Still I consider he is entitled to some remuneration for the labour and time bestowed. I shall therefore award him 1*l.*, which will be a verdict for plaintiff of 1*l.* 5*s.*

BURTON v. DOWDAN.—This was an action brought in the Marylebone County Court, to recover 3*l.* 3*s.* for services rendered in the capacity of an architect. The plaintiff deposed to being engaged by the defendant to prepare plans for his premises. He did so, and expected to have had the contract for the work in question: he did not get it. Mr. Alderman Lawrence did, because it was thought he had more influence with the district surveyor.

Defendant said he had not had any of the drawings. Mr. Burton proposed an iron column, which he, defendant, had a great objection to; and as the plaintiff said the building could not be securely constructed without the column, he applied to Mr. Alderman Lawrence, who said it could be erected without the obnoxious supporter, and he gave him the job, and for no other reason.

The judge said he had so frequently adjudicated upon similar suits, that he had no hesitation in giving a verdict for the defendant.

#### THE FOUNDATIONS OF BRIDGES.

##### THE BRIDGES OF THE THAMES.

THE failure of Westminster and Blackfriars bridges has been the heading to, or the subject of, numerous articles in the papers; and questions similar to that asked in THE BUILDER of the 17th (viz., if the removal of old London-bridge has caused the failure of these, why have not the Southwark and Waterloo bridges shared the same fate?), are constantly being put: will you permit me to answer, and I will endeavour to do so in a manner that will prevent your being troubled with such questions for the future.

There are two simple requisites to make a foundation in the bed of a river like the Thames secure.

1stly. The area must be sufficiently great to resist the pressure of the superimposed structure.

2ndly. This area must be obtained at such a depth beneath the river bed, not only that a sufficiently resistant stratum may be reached; but that it may be left undisturbed, should the bed of the river be lowered by artificial or by natural means. The tonnage of the vessels navigating the river may be required to be increased, and the depth of water, therefore, increased by dredging. Obstructions to the ebb and flow of the tide may be removed, and the greater velocity thus allowed to the water scour away the bottom. The determination of this proper depth for the foundation must be confided to the judgment of a practised engineer, and there are three modes by which, in modern practice, he may reach it. 1stly. By timber piling within a cofferdam, as in Waterloo, Southwark, and all the other bridges over the Thames except Westminster and Blackfriars.

2ndly. By excavating down to the proper stratum within a cofferdam, as in the Potomac aqueduct. 3rdly. By sinking permanent cofferdams, in the shape of large iron cylinders, as at Rochester. In 1738, when Labeley designed Westminster-bridge, none of the above methods of founding piers were known, and caissons were used which were water-tight chests sunk upon the bed of the river, previously dredged level to receive them, and on the bottom of these chests the masonry of the piers was erected. In 1760, Milne commenced Blackfriars-bridge, and the same mode of getting in the foundations was adopted, but before sink-